

INSTRUCTION MANUAL

DU MONT[®]

MCA-450-A and MCA-451-A

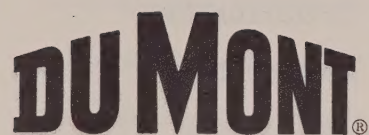
BASE STATIONS

ALLEN B. DU MONT LABORATORIES, INC.

Technical Products Division

760 BLOOMFIELD AVENUE, CLIFTON, NEW JERSEY

INSTRUCTION MANUAL



MCA-450-A and MCA-451-A BASE STATIONS

The separate Instruction Manuals for the 5804-(a)-# and 5806-(a)-# Communications Units, and the 5815-(a)-# Power Supply when used in conjunction with this Manual, constitute the complete instructional information for the MCA-450-A and MCA-451-A Base Stations.

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Technical Products Division

760 BLOOMFIELD AVENUE, CLIFTON, NEW JERSEY

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WARRANTY

The Company warrants the equipment to be free from defects in workmanship and material under normal and proper use and service for the uses and purposes for which it is designed, and agrees to repair or replace at the place of manufacture, without charge, all parts thereof showing such defects which are returned for inspection to the Company's factory, transportation prepaid, within a period of one (1) year from date of delivery, provided that such inspection discloses to the satisfaction of the Company that the defects are as claimed, and provided also, that the equipment has not been altered, repaired, subjected to misuse, negligence or accident, or damaged by lightning, excessive current or otherwise, or had its serial number or any part thereof altered, defaced, or removed. Tubes, vibrators, fuses and pilot lamps shall be deemed to be covered by the manufacturer's standard warranty applicable thereto, and such items shall be and are hereby excluded from the provisions of this warranty.

The Company warrants that all of the items of equipment that are of the Company's own manufacture will meet the technical specifications of the Standards of Good Engineering Practices, as established by the Federal Communications Commission. As to all items of equipment that are not manufactured by the Company, it is understood that the standard warranty of the manufacturer or supplier thereof shall be the only warranty applicable to such equipment.

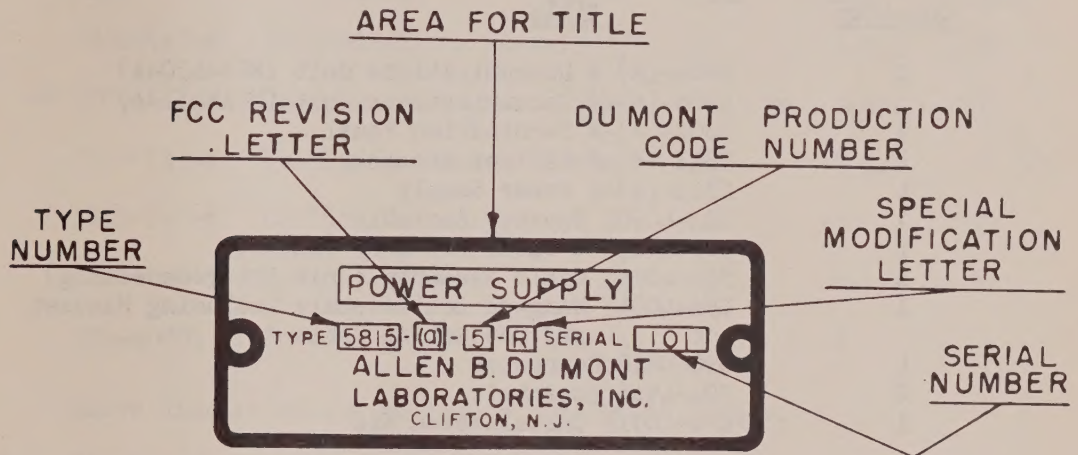
Except as herein specifically provided, no warranty, express or implied, other than that of title, shall apply to any equipment sold hereunder. In no event shall the Company be liable for damages by reason of the failure of the equipment to function properly or for any consequential damages.

CHANGES

The Company reserves the right to modify or change the equipment, in whole or in part, at any time prior to delivery thereof, in order to include therein electric or mechanical refinements deemed appropriate by the Company, but without incurring any liability to modify or change any equipment previously delivered, or to supply new equipment in accordance with earlier specifications.

DUMONT UNIT NAMEPLATE

Each DuMont unit is identified by a descriptive nameplate similar to the sample diagrammed below.



For Communications Units, Transmitters and RF Power Amplifiers, a change in the FCC Revision Letter indicates a unit modification affecting FCC licensing.

For all units, a change in the DuMont Production Code Number does not affect FCC licensing.

For all units, an added Special Modification Letter indicates a change in the original unit for a special application and does not affect FCC licensing. To this date, the Special Modification Letters assigned are:

<u>LETTER</u>	<u>UNIT MODIFICATION</u>
C	Carrier-operated relay
M	Multiplexing
N	Narrow-band operation
R	Repeater service
S	Wired for Selective Calling
T	Tone-operated relay
W	Wide-band operation

Note that the units originally designed to provide one or more of the above functions do not carry the Special Modification Letter. See the Instruction Manual text for complete unit details. Units described in this Manual are not necessarily available modified for any or all of these special applications.

ALLEN B. DUMONT LABORATORIES, INC.
TECHNICAL PRODUCTS DIVISION
760 BLOOMFIELD AVENUE, CLIFTON, NEW JERSEY

SPECIFICATIONS

1. Equipment Complement - MCA-450-A or MCA-451-A Base Station

<u>Quantity</u>	<u>Title</u>
1	5804-(a)-# Communications Unit (MCA-450-A)
or	5806-(a)-# Communications Unit (MCA-451-A)
1	5809-(a)-# Termination Panel
1	5813-(a)-# Cabinet Assembly
1	5815-(a)-# Power Supply
1	18A-40901 Speaker Assembly
1	50A-40138-2 Cable Assembly (Audio)
1	50D-40286 Cable Assembly (Unit Interconnecting)
1	09A-40847 Hang-up Box Assembly including Handset and Connecting Cable
1	09040810 Connector
2	30A-4946 Eccentric
1	89A-40715 Installation Kit

Accessories available:

17C-40082 Desk Microphone and 89A-30708 Amplifier
 89A-40850 Additional Frequency Kit
 89A-40816 Extended Local Control Assembly
 18A-40834-102 Speaker Assembly
 89A-40959 Foot Switch Assembly (for Desk Microphone only)

The MCA-450-A and MCA-451-A Base Stations use the 5804-(a)-# and 5806-(a)-# Communications Units respectively. The technical data for the Transmitter portion of the Base Stations has been filed with the FCC by the manufacturer under the designation 5804-(a)-# and 5806-(a)-#. All communications between the applicant or licensee and the FCC should reference the "5804-(a)-#" or the "5806-(a)-# Transmitter" and not the MCA-450-A or the MCA-451-A Base Station as the nomenclature designation.

2. Physical Characteristics

MCA-450-A or MCA-451-A Base Station - Weight of entire assembly:
165 pounds

<u>Unit</u>	<u>Name</u>	<u>Height</u>	<u>Width</u>	<u>Depth</u>	<u>Weight</u>
5804-(a)-#	Communications Unit	13-3/8	20	4-3/4	10
or 5806-(a)-#	Communications Unit	13-3/8	20	4-3/4	10
5809-(a)-#	Termination Panel	5-1/2	20	3-1/2	7-1/2
5813-(a)-#	Cabinet Assembly	40	22	12	35
5815-(a)-#	Power Supply	8-1/2	20	6-1/4	50
18A-40901	Speaker Assembly	6-13/16	20	3	4

Above dimensions are in inches, weight in pounds.

3. Electrical Specifications

A. Input Power

Standby - 117 volts ac 50/60 cps, 160 watts
Transmit - 117 volts ac 50/60 cps, 360 watts

B. RF Output Power

450 to 460 Mc - 15 watts continuous duty
460 to 462 and 468 to 470 Mc - 12 watts continuous duty

C. Audio Input From Telephone Line

20 db minimum below 1.73 volts across 600 ohms

D. Audio Output

1 watt into a 3.2-ohm local loudspeaker and 6 mw into a 600-ohm telephone line. Outputs operate simultaneously at 10% distortion or less.

E. FCC Designation of Emission - 36F3

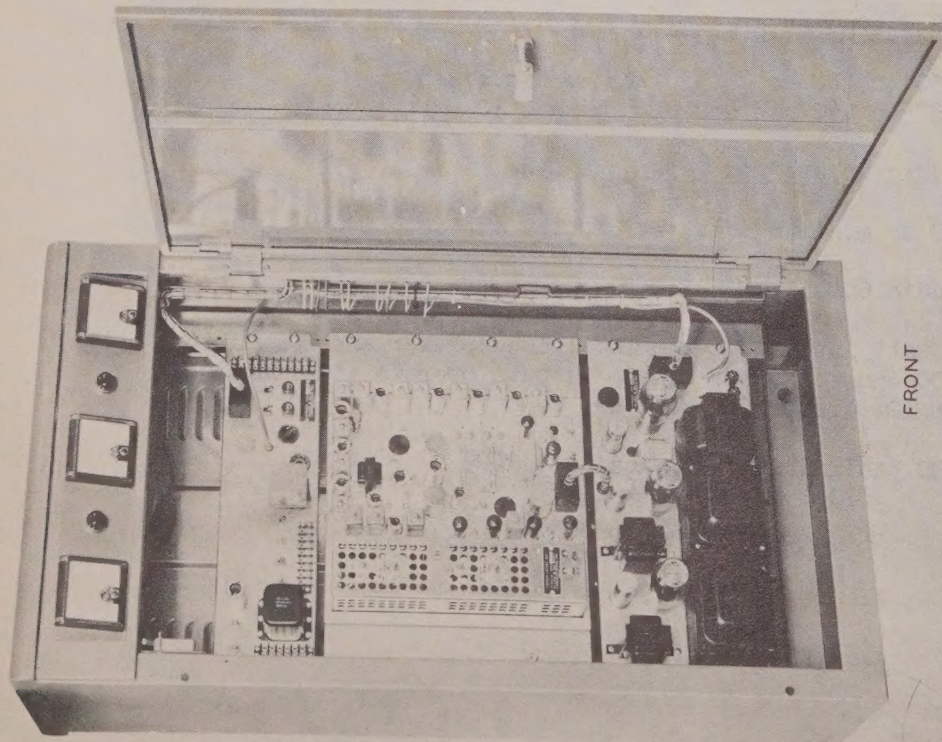
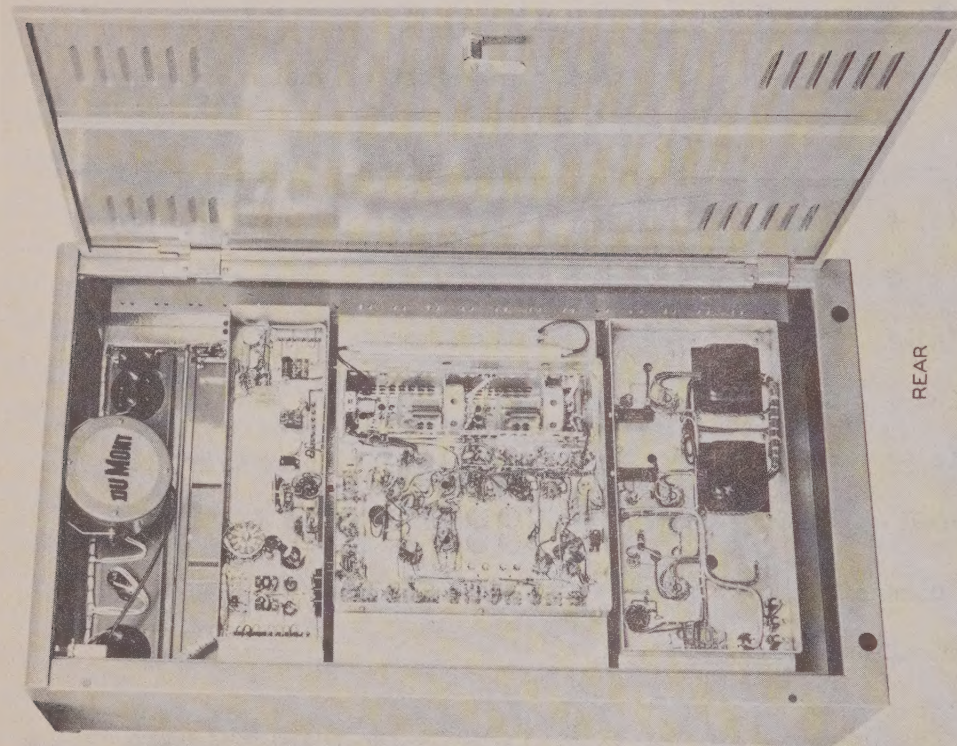


FIGURE 1
MCA-450-A AND MCA-451-A BASE STATIONS.

1.0 INTRODUCTION

The MCA-450-A and MCA-451-A Base Stations are designed to provide FM communication facilities in the frequency range of 450 to 470 Mc to and from mobile units.

The MCA-450-A Base Station operates in the frequency range of 450 to 460 Mc, while the MCA-451-A Station transmits in the Class "A" Citizens Radio Service in the United States (460 to 462 and 468 to 470 Mc) with the power input to the final power amplifier stage limited to 50 watts.

The Base Station is fully equipped with the transmitter, receiver and power supplies as well as the control facilities to permit operation in the required frequency range. The transmitter and receiver portions of the Base Station are contained on the chassis of the 5804-(a)-# or 5806-(a)-# Communications Unit. The 5815-(a)-# Power Supply is separate from the Communications Unit but provides the operating voltages for it and the associated 5809-(a)-# Termination Panel.

Facilities are provided for the local and/or remote control of the Station as well as intercommunication with the remote control point or points.

By means of a simply added audio amplifier, a low-level desk microphone may be used instead of, or in addition to, the Handset and Hang-up Box Assembly.

Some indication of the operating condition of the Base Station is given by three meters and two indicating lamps at the top of the Cabinet Assembly. A complete description follows in the next Section 2.0.

Interlock switches on the front and rear doors prevent accidental contact with high voltage points inside the cabinet. The switches may be manually operated to permit adjustment and maintenance, but they always return to the automatic condition when the door is closed.

To obtain further information regarding this equipment or for a listing of available Du Mont accessory units, address inquiries to

Allen B. Du Mont Laboratories, Inc.
Technical Products Division
Mobile Communication Sales Engineering
760 Bloomfield Avenue, Clifton, New Jersey

2.0 DESCRIPTION

The MCA-450-A and MCA-451-A Base Stations consist of the units and assemblies listed in the Equipment Complement shown in the Specifications Section of this Manual.

The Cabinet Assembly is designed to be a convenient size for shelf or bench mounting. Bolt holes in the bottom allow for fastening to the mounting surface. Connections between the units are made through the plug connectors and cables located in the Cabinet Assembly.

A front and rear door may be opened to permit installation and servicing of the units. An interlock switch on each door removes high voltage to prevent accidental contact. Each switch may be operated manually to replace the high voltage for maintenance purposes, but it is returned to the automatic condition when the door is closed. As may be seen in the Systems Drawing of Figure 6, the door switches are connected in series, so that opening either door will cut off the high potential.

Located on a sloping panel over the front door are three meters and two indicating lamps. The meters provide readings of the ac line voltage and the Transmitter power amplifier plate current and voltage. One lamp (green) indicates the standby condition of the Station, while the other (red) indicates Transmitter operation. When the Radio-Intercom switch on the Termination Panel is placed on "Intercom", the red Transmit lamp flashes on and off continuously as a warning that no actual transmission can take place.

The 18A-40901 Speaker Assembly is constructed on a panel and located at the top of the Cabinet Assembly. For speaker control, a Volume adjustment and an On-Off switch are provided. The switch permits the speaker to be left off when the Base Station is used for unattended operation.

The Handset and Hang-up Box may be located as convenient for operation.

3.0 INSTALLATION

Locate the Cabinet Assembly as convenient, allowing for the opening of the doors. Use wood, lag or machine screws to fasten the Cabinet to the mounting surface.

Connect the external wiring to the system through the access holes provided in the Cabinet. Two knock-out holes are located in the bottom, allowing entrance for conduit or other cable ducts. If such conduits are used, it is recommended that the remote control lines be led through one, while the ac and antenna cables are located in the other. This will minimize ac and/or rf pickup in the control line.

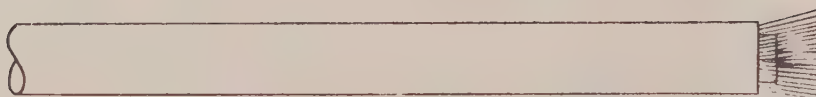
In addition to the two holes mentioned above, two holes are available at the rear of the Cabinet Assembly immediately underneath the rear door. If desired use these holes in place of those in the floor of the Cabinet.

Make sure that the Filament and Plate switches are off, and connect the ac line at 117 volts 50/60 cps to TB4 of the 5809-(a)-# Termination Panel. TB4 is situated on the inside rear flange of the Panel chassis.

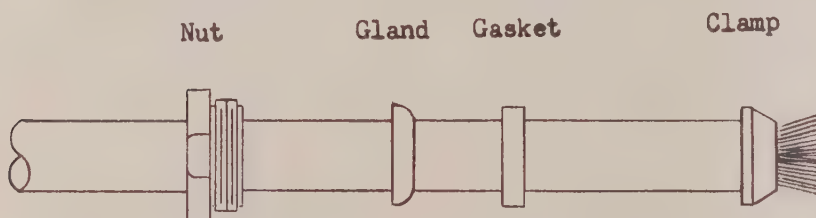
Connect the Handset and Hang-up Box Assembly to TB3 of the Termination Panel by means of the Cable Assembly provided. The Systems Drawing of Figure 6 shows the connections to be made. Check the "Notes" on this Systems Drawing for the correct jumper connections required to permit speaker muting or for unattended remote operation. In any case, remove the jumper between terminals 6 and 10 in the Hang-up Box Assembly. The Hang-up Box itself should be mounted as convenient for operation. Remove the back plate by partially unscrewing the single screw in the bottom of the Box. Use the plate as a template to locate the mounting holes. The Hang-up Box is delivered with the cable connected and led through the rubber grommet at the bottom of the Box. To lead the cable out through the back plate, disconnect the wiring and pull it through the grommet. Pull the Cable through the large hole in the back plate and through the mounting surface and fasten the plate with screws.

Connect the 18A-40901 Speaker Assembly to TB2 of the Termination Panel by means of the Cable Assembly provided. The Systems Drawing Figure 6 shows the connections to be made. Mount the Loudspeaker Assembly as convenient using the mounting screws provided.

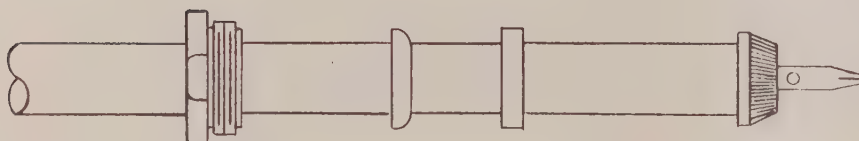
The antenna transmission line should be led inside and attached to the coaxial plug that is shipped in position on the antenna receptacle located on the front of the left adaptor bracket of the Communications Unit. Figure 2 shows the recommended method of attaching the plug to the antenna cable.



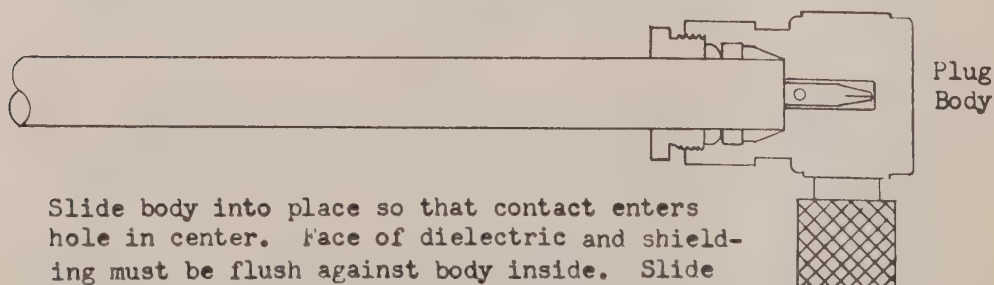
Cut end of cable even. Remove $3/8$ inch of jacket. Comb out braid as shown. Bare $1/4$ inch of center conductor. Tin center conductor.



Taper braid as shown. Slide above parts on cable. Slide clamp over braid with internal shoulder of clamp flush against end of jacket.



Smooth braid back over clamp and trim. Solder tip contact to center conductor. Avoid excess heat or solder. End of dielectric must be clean. Contact must be flush against dielectric. Keep outside of contact free of solder.



Slide body into place so that contact enters hole in center. Face of dielectric and shielding must be flush against body inside. Slide nut, gland and gasket into body and tighten nut with wrench until firmly in place.

FIGURE 2. COAXIAL PLUG WIRING METHOD

All the connections made to this point permit the local operation of the Base Station. To operate the Station from one or more remote locations, Du Mont Remote Control Equipment is available. The connections from the telephone or other lines for this purpose should be made to TBl on the 5809-(a)-# Termination Panel. Two-, three-, or four-wire lines may be used to accommodate the audio and dc control voltages required for Transmitter operation. The recommended types of connections are listed in Figure 3 in order of preference.

If the use of the low-level Desk Microphone is desired, the 89A-30708 Amplifier must be mounted in place of the cover plate on the surface of the chassis of the 5809-(a)-# Termination Panel. Fasten the Amplifier to the Panel and plug the connecting cable into the Accessory receptacle J2 located on the small bracket at the rear.

All the connections made to this point permit strictly local operation of the Base Station. Extension of this control to a nearby point is made available by the 89A-40816 Extended Local Control. This is a desk-top slope-front cabinet containing the components required to duplicate the Termination Panel and Speaker Assembly facilities located in the Base Station Cabinet itself.

To operate the Station from one or more remote locations, Du Mont Remote Control Equipment is available. The connections from the telephone or other lines for this purpose should be made to TBl in the 5809-(a)-# Termination Panel. Two-, three-, or four-wire lines may be used to accommodate the audio and dc control voltages required for transmitter operation. The recommended types of connections are listed in Figure 3 in order of preference.

4.0 OPERATION

For the operating procedures to follow, it is assumed that the Receiver and Transmitter have been adjusted according to their Instruction Manuals and are connected as indicated by the Systems Drawing of Figure 6.

Set the Receiver-to-Line and Line-to-Transmitter Gain controls fully counterclockwise. Set the Receiver Squelch control fully clockwise. The Squelch switch should be in the up (Local) position. Set the Radio-Intercom switch to "Radio".

Check that the Handset is placed on the hook of the Hang-up Box.

4.01 Local Operation

Place the Filament switch on. Note that the green Standby lamp located over the front door is illuminated, and the line meter reads about 117 volts.

After the warm-up period, a loud rushing noise will be heard in the loudspeaker. Rotate the speaker volume control as desired to provide adequate level.

With no signal being received, rotate the Squelch control slowly counterclockwise to the point just beyond which the noise is silenced. Do not adjust the control past this point. Note that if a signal is being received, the background noise will be quieted regardless of the Squelch control position.

When the noise is silenced, place the Squelch switch in the "Remote" position. The rushing noise will again be heard.

Remove the Handset from the hook of the Hang-up Box. If the jumper between terminals 7 and 8 of TB3 on the 5809-(a)-# Termination Panel has been removed, the speaker will be muted. Regardless of this jumper, however, the noise should appear in the handset earpiece and be controlled by the Hang-up Box Volume control.

Return the Squelch switch to the "Local" position. The Receiver rushing noise will again be silenced.

To check the muting of the Receiver when the Transmitter is placed in operation, rotate the Squelch control clockwise until the rushing noise is again heard.

Depress the Handset press-to-talk button. The red indicator at the top of the Cabinet Assembly should light and the rushing noise in the Handset and loudspeaker will be silenced.

The Plate switch on the 5809-(a)-# Termination Panel will operate the Transmitter in the same manner as the press-to-talk button of the Handset. This switch is provided to facilitate Transmitter tuning at the local Cabinet Assembly. As this switch prevents normal off and on operation of the Transmitter, it must always be returned to the off (down) position when such tuning is completed.

4.02 Remote Operation

It is assumed that the Remote Control Equipment connected to the Base Station has been set up according to the Instruction Manual provided with it. In general the audio level applied to the Base Station must be no less than 20 db below 1.73 volts across 600 ohms (zero db reference).

To provide remote Receiver Squelch control, refer to the manufacturer for the details of the possible telephone line connections to the Remote Equipment. In operation, the Squelch switch at the Termination Panel is set to "Remote" and the Squelch control at the remote point is adjusted in the same manner as the local control.

The power Control relay at the Base Station is operated by the dc control voltage developed at the Remote Control Equipment. For reliable relay operation, the voltage applied at the Termination Panel end must be at least 30 volts.

To transmit, the remote operator depresses the press-to-talk button on his handset, or the microphone switch if a desk microphone is used. While the operator speaks or operates the tone switch to provide an audio signal to the Transmitter, the Line-to-Transmitter control on the Termination Panel should be adjusted until the line audio is amplified sufficiently to just reach the clipping level. The Transmitter Instruction Manual provides the description of the Deviation control setting of this level.

It should be noted that the local Hang-up Box is so wired that when the Handset is removed from the hook, the relay circuit is interrupted to prevent remote operation while the local transmission takes place.

The audio level to be applied to the telephone line from the Receiver must not exceed zero db (6 mw into a 500-ohm line). To adjust, set the Squelch switch to "Local" and rotate the Squelch control to produce the rushing noise. Connect a db meter to the audio line at the terminal strip TBl on the Termination Panel, and adjust the "Receiver-to-Line" control for zero db output. If a db meter is not available, use an ac voltmeter and adjust the control for 1.73 volts.

4.03 Intercommunication Operation

Switch the Radio-Intercom switch to "Intercom". The red indicator lamp at the top of the Cabinet Assembly flashes continuously as long as the switch is in the "Intercom" position as a reminder to the serviceman to return the system to radio operation when the maintenance work is completed.

In this position, the local Handset is used for intercommunication purposes with the remote control points. To complete the microphone circuit of the Handset, depress the press-to-talk button. The Radio-Intercom switch in the Intercom position prevents the Transmitter from being placed on the air. Intercom audio only is applied to the Handset, while the Receiver audio is applied to the local Loudspeaker regardless of the use of the speaker muting. This is to permit the local operator or serviceman to hear mobile calls during intercom operation and to restore the station to radio use if necessary.

5.0 MAINTENANCE

Consult the separate Instruction Manuals of the 5804-(a)-# and 5806-(a)-# Communications Units and the 5815-(a)-# Power Supply for the maintenance details and adjustment procedures of these units.

The only maintenance required for the 5813-(a)-# Cabinet Assembly and the 5809-(a)-# Termination Panel is the periodic cleaning of the plug-in transfer relay on the Termination Panel.

Remove the dust cover by loosening the retaining screw. Use a burnishing tool between the normally closed contacts of the relay. Do NOT squeeze the contact springs together with the fingers. Hold the ARMATURE down against the core to clean the contacts that close on operation. In an emergency a clean business card may be used in place of the burnishing tool, but do NOT use sandpaper, ignition files or other similar rough tools.

For the optional 89A-30708 Microphone Amplifier, the following voltage readings are positive dc to ground measured with a Simpson Model 260 Multimeter unless otherwise specified.

Pin No.								
Tube	Type	1	2	3	4	5	6	7
V1	6BH6	0	2	↑ 6.3ac ↑		70	35	.2
V2	6CB6	0	5.4	↑ 6.3ac ↑		200	200	200

6.0 ELECTRICAL PARTS LISTS

6.01 5813-(a)-# Cabinet Assembly

1. Cabinet Components

<u>Symbol</u>	<u>Du Mont Part Number</u>	<u>Description</u>
I1	12000980	Lamp, incandescent, 230 volts, 10 W (Standby)
I2	12002510	Lamp, incandescent, 120 volts, 6 W (Transmit)
M1	28001850	Meter, 0-1000 V dc (Plate Voltage)
M2	28001860	Meter, 0-150 V ac (Line Voltage)
M3	28001840	Meter, 0-250 ma dc (Plate Current)
R1	02243350	Resistor, fixed, film, 1 megohm, +1%, 1 W
S1 & 2	05010690	Switch, door interlock
TB1	40000270	Board, 18 terminals

2. Cabinet Cable Connectors

<u>Symbol</u>	<u>Du Mont Part Number</u>	<u>Description</u>
P1	09005230	female, 18 contacts (On 50E-41111 Cable Assembly to 5809-(a)-# Termination Panel)
P2	09000730	female, 8 contacts (On 50E-40409 Cable Assembly to first Receiver)
P3	09000730	female, 8 contacts (On 50C-40983 Cable Assembly to second Receiver)
P4	09000320	female, 12 contacts (On 50E-40409 Cable Assembly to Transmitter)
P5	09000320	female, 12 contacts (On 50E-40409 Cable Assembly to 5816-(a)-# Power Supply)
--	09015800	High Voltage (On High Voltage Cables)
--	09041440	RF, BNC Type (On 50A-40441 Cable Assembly)

6.02 5809-(a)-# Termination Panel

<u>Symbol</u>	<u>Du Mont Part Number</u>	<u>Description</u>
CAPACITORS (fixed, electrolytic unless otherwise specified)		
C1	03016100	paper, .5 uf, +30 -20%, 200 V
C2	03138600	5 uf, +100 -10%, 150 V
C3	03151480	ceramic, .01 uf, +80 -20%, 600 V
C4	03138600	5 uf, +100 -10%, 150 V
C5	03014710	10 uf, +75 -0%, 450 V
C6	03124290	ceramic, 100 uuf, $\pm 10\%$, 350 V
F1 & 2	11000820	Fuse, Cartridge, 8 amperes
I1	05010700	Relay, Thermal
J1	09041420	Connector, Male, 18 contacts
J2	34001760	Socket, 11 Pins
J3	09000880	Connector, Female, 2 contacts
J4	09002760	Connector, Female, 1 contact
K1	05011420	Relay
RESISTORS (fixed, composition, $\pm 10\%$, 1/2 W unless otherwise specified)		
R1	01065000	variable, 250K ohms, $\pm 20\%$, 1/4 W
R2	02032010	100K ohms
R3	02031690	220 ohms
R4	02031810	2.2K ohms
R5	02031650	100 ohms
R6	02032030	150K ohms
R7	02031970	47K ohms
R8	02106250	wire wound, 15K ohms, $\pm 5\%$, 10 W
R9	01065000	variable, 250K ohms, $\pm 20\%$, 1/4 W
R10	02031770	1K ohms
R11	01025010	variable, 10K ohms, $\pm 20\%$, 1/4 W
R12	02148510	wire wound, 7K ohms, $\pm 5\%$, 10 W
R14 & 15	02031850	4.7K ohms
S1	05B-30979	Switch, Rotary, SPDT
S2 & 3	05010660	Switch, SPST, 10 amperes
S4	05002010	Switch, Toggle, SPDT
T1	20009530	Transformer, Audio
TB1	40000750	Board, 6 terminals
TB2	40000770	Board, 8 terminals
TB3	40000790	Board, 10 terminals
TB4	40001910	Board, 2 terminals
V1	25001530	Tube, 12AT7

6.03 18A-40901 Speaker Assembly

<u>Symbol</u>	<u>Du Mont Part Number</u>	<u>Description</u>
LS1	18003620	Loudspeaker, 5-inch
R1	02105120	Resistor, fixed, wire wound, 3.3 ohms, +10%, 2 W
R2	01B-40073	Volume Control (front, 4 ohms; rear, 35 ohms, each wire wound)
S1	05002040	Switich, SPDT
--	45005750	Knob, pointer

6.04 18A-40834-102 Speaker Assembly

<u>Du Mont Part Number</u>	<u>Description</u>
18003620	Loudspeaker, 5-inch
01B-40073	Volume Control (front, 4 ohms; rear, 35 ohms, each wire wound)
45005750	Knob, pointer

6.05 09A-40847 Hang-up Box Assembly

<u>Symbol</u>	<u>Du Mont Part Number</u>	<u>Description</u>
J1	09002750	Receptacle, female, 4 contacts
R1	01A-40207	Resistor, variable, composition, 5K ohms, +20%, 1/4 W
R2	02102640	Resistor, fixed, wire wound, 4.7 ohms, +10%, 1 W
--	17C-40730	Handset
--	09D-40030	Hang-up Box
--	50C-40399	Cable Assembly

6.06 89A-30708 Amplifier

<u>Symbol</u>	<u>Du Mont Part Number</u>	<u>Description</u>
CAPACITORS (fixed, electrolytic, <u>+20%</u> , 1000 V unless otherwise specified)		
C1	03157150	ceramic, 100 uuf
C2	03138600	5 uf, +100 -10%, 150 V
C3	03017490	2 sections 20 X 20 uf, +50 -10%, 450 V
C4	03156620	ceramic, 1000 uuf
C5	03138600	5 uf, +100 -10%, 150 V
J1	09041870	Connector, 3 contacts
J2	09041860	Connector, 11 contacts
RESISTORS (fixed, composition, <u>+10%</u> , 1/2 W unless otherwise specified)		
R1	02032030	150K ohms
R2	02031670	150 ohms
R3 & 4	02032030	150K ohms
R5	02031970	47K ohms
R6	01065000	variable, 250K ohms, <u>+20%</u> , 1/4 W
R8	02031710	330 ohms
R9	02034930	22K ohms, 1 W
V1	25008670	Tube, 6BH6
V2	25002670	Tube, 6CB6

■

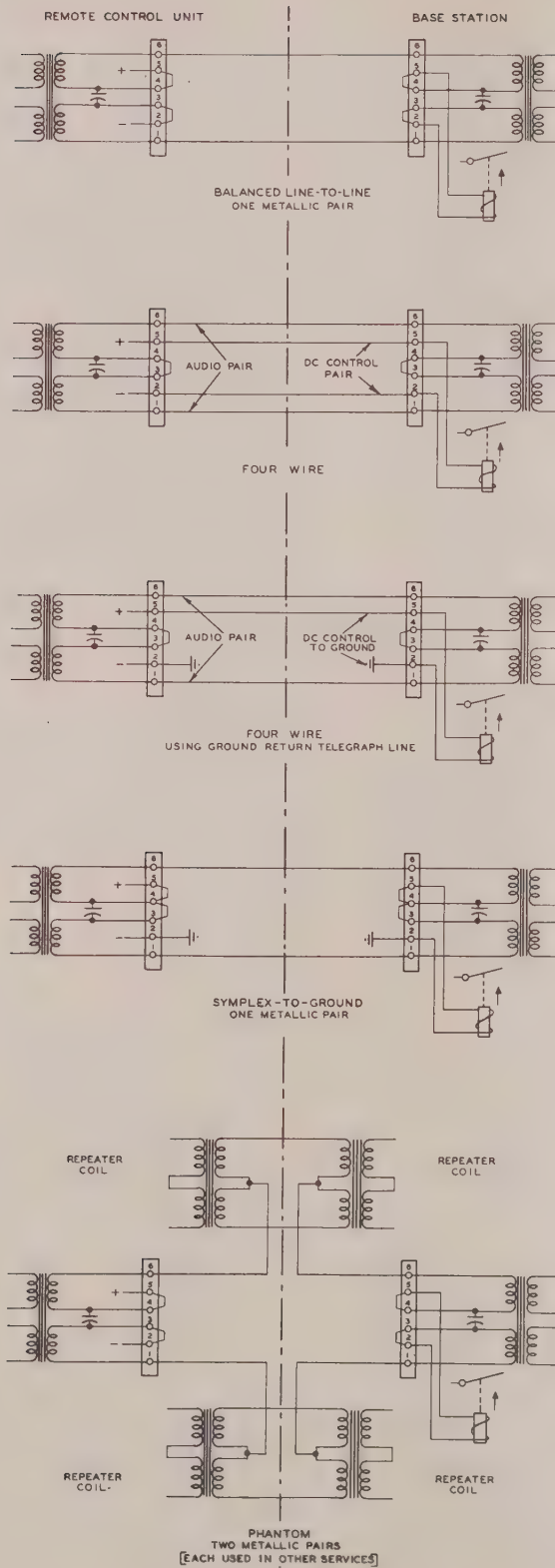


FIGURE 3
CONTROL & AUDIO LINE CONNECTIONS
(SHOWN FROM TOP TO BOTTOM IN ORDER OF PREFERENCE)

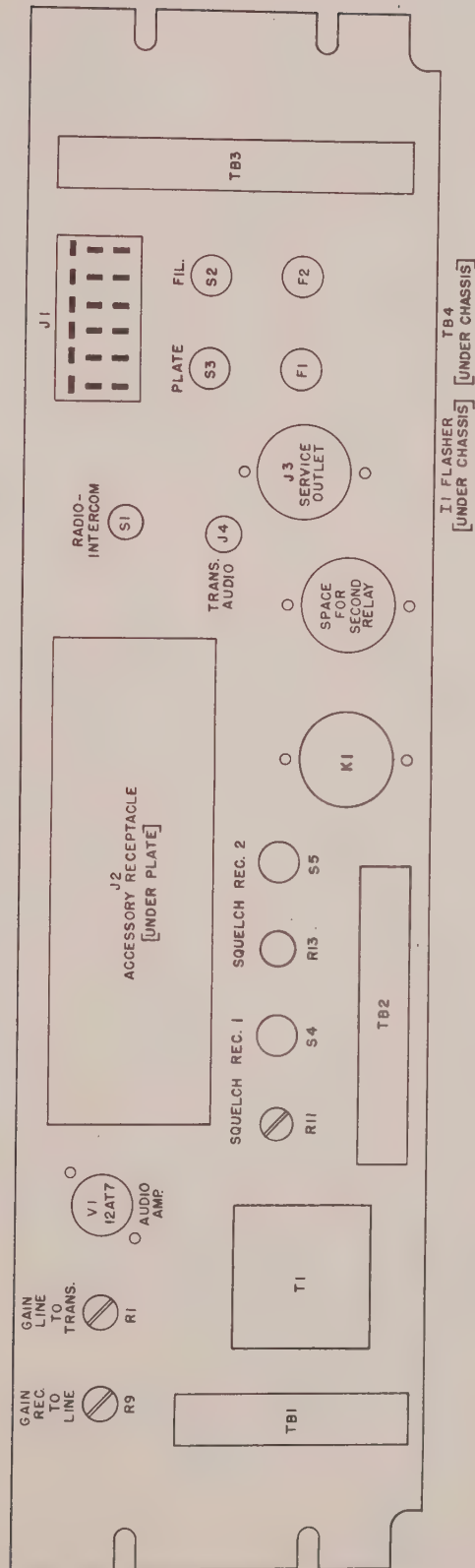
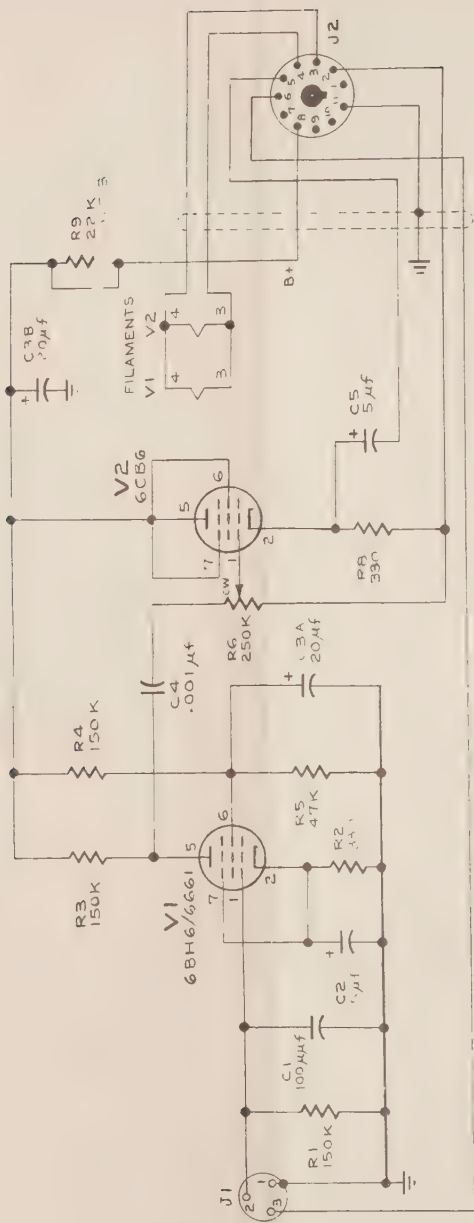


FIGURE 4
TERMINATION PANEL CHASSIS PARTS LOCATION DIAGRAM

7 - CONNECTORS SHOWN FROM WIRING SIDES.





- NOTES:
- 1- RESISTORS ARE IN OHMS, K=THOUSAND.
 - 2- RECEPTACLES SHOWN FROM WIRING SIDES.
 - 3- JUMPER USED FOR B+ FROM 200 TO 275 VOLTS.
REMOVE JUMPER FOR B+ ABOVE 275 VOLTS.

FIGURE 7
SCHEMATIC B-40228
89B-30708 AMPLIFIER

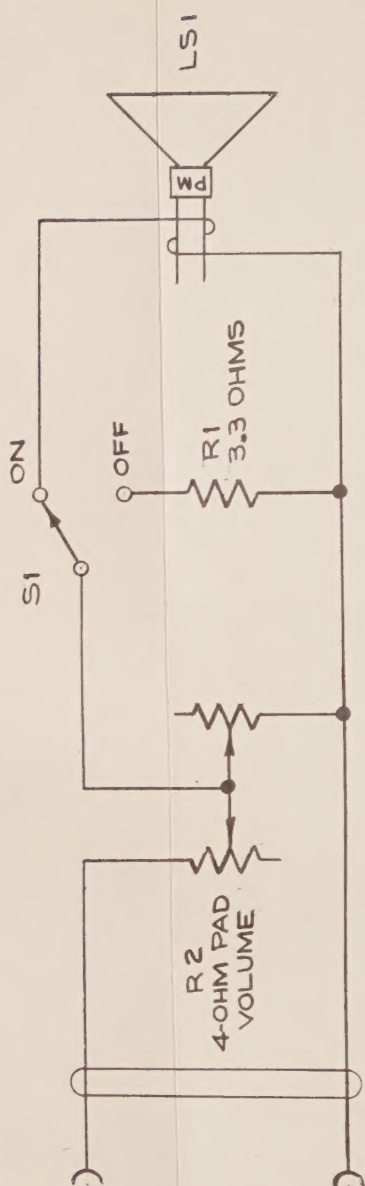


FIGURE 8
SCHEMATIC A-41037
18A-40901 SPEAKER ASSEMBLY

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